California Department of General Services

Post-Occupancy Evaluation Program

Strategic Plan

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EXECUTIVE SUMMARY

Background

In December 2000, Dennis Dunne, Chief Deputy Director of the Department of General Services, led a Post-Occupancy Evaluation (POE) Workshop attended by about 35 people from various divisions within DGS. The purpose was to present the concept of the POE as a method to provide better public facilities to the occupants, users and operators of such facilities.

POE originated in the 1960s as a method to evaluate the success or failures of completed projects and utilize the information to improve future projects. It has been used by a large number of large building delivery organizations including the Army Corps of Engineers, US GSA, the World Bank, California Department of Corrections, Ministry of Education of France, US Navy, States of Minnesota and Massachusetts and others.

Most previous POEs have involved case studies of buildings as they actually operate. These studies have often relied on surveys, interviews and other user-oriented studies.

Following the workshop, the Executive Policy Committee of RESD and DSA provided direction to develop a POE Program for use on RESD capital and lease projects and DSA public school projects. This strategic plan is the first step to incorporation of the POE program into the operations of RESD and DSA.

Goals

The Department of General Services (DGS) Post-Occupancy Evaluation (POE) Program is aimed at helping DGS become more effective and customer-oriented in the planning, design, construction, and operation of buildings and infrastructure. It will help DGS produce cost effective buildings that are “models of energy, water, and materials efficiency; while providing healthy, productive and comfortable indoor environments and long-term benefits to Californians." (Executive Order D-16-00).

The DGS POE Program will extend previous POE efforts. In addition to conducting case studies, the POE program will include customer interaction and performance feedback throughout the building delivery process. There

will be special focus on "feed-forward": using the lessons derived from POE to improve DGS buildings and building delivery processes.

Benefits

The POE Program will have both an immediate impact and a long-term commitment to organizational learning. It will create a structured and efficient process for:

1) setting measurable performance criteria for buildings and building delivery process.
2) evaluating performance through customer feedback and technical assessment.
3) interpreting results.
4) creating a centralized "organizational memory."
5) widely distributing findings in paper and electronic form.
6) creating organizational mechanisms and incentives for implementing findings and bringing about change and improvement. The POE Program will support the strategic goals and objectives of DGS, Division of the State Architect (DSA) and Real Estate Services Division (RESD) and be closely linked to other initiatives such as Excellence in Public Buildings, commissioning, OneDGS, and others. It will improve communications between DGS and its customers and allow DGS to learn faster and more effectively and to incorporate lessons-learned on future project.

In summary, the POE program will enable DGS to deliver better buildings to its customers and stakeholders.

Program Components

The program will have several components:

1. Level I POE's*: Continuous performance feedback and feed-forward process--Cost-effectively documenting and assessing most DGS buildings:*

- Establishing procedures for collaborating with customers and design teams to set measurable goals that can be assessed through POEs and other techniques.
- Documenting the building, building process, performance, and customer feedback.
- Performing a *Quick Response Study (QRS)* a few months after occupancy.

- Conducting on-line surveys with users, operators and design process participants.
- Analyzing and reporting results and entering them into the POE database.
- Providing mechanism for using lessons-learned on future projects.

2. Level II POE's: *Case studies aimed at understanding WHY a facility operates as it does, by looking at the relationships between building delivery, design, specification and operations:*

- Creating Level I documentation and data collection.
- Performing interviews, site visits, technical assessments and analysis of records.
- Producing case study reports and comparisons among settings
- Providing mechanism for using lessons-learned on future projects.

3. Level III POE's: *Special, focused studies that address specific issues with broad application for DGS or its customers. Sample studies might include:*

- Documenting the relationships of first-costs to life-cycle costs of DGS buildings. Exploring the effectiveness of sustainability and energy saving measures.
- Exploring the impact of new technologies such as raised flooring on flexibility, productivity and satisfaction.
- Investigating smart classrooms.

In each case, there will be particular attention to how the lessons learned from each Level III POE will be used in subsequent projects.

4. Design Guides: *Because they are based on research and consensus, carefully prepared design guides can establish basic goals, issues and principles and make programming and design simpler and less contentious for repeated building types, without reducing creativity or creating "cookie cutter solutions." Initial design guides might include:*

- DMV offices or CDF fire stations
- Sustainable schools
- High performance classrooms
- General office buildings

- Energy consumption per square foot of space
- Life span of facilities.

5. POE Program Databases and Internet and Intranet web site: *The center of the Program will be a set of databases that are accessible through a well-designed web site. The databases and web site will allow:*

- Entry of discussion and informal lessons-learned as well as Level I, Level II and Level III documentation and results.
- Staff (and, selectively, customers and consultants) to see information sorted by project, consultant, customer, system and other characteristics.
- Electronic access to design guides and other aids.

Implementation

It is proposed that the current Charter Team members, Charter Team Leader, Steering Team and Executive Sponsors continue to steer the program through a three-year implementation plan. Specific branches and groups within DGS will take the lead with individual components. However, it is likely that at least one person would need to be assigned to overall day-to-day coordination.

A summary schedule for FY 2001-2002 activities follows, including several program components to be developed and pilot-tested.

1) Develop and pilot-test the goal-setting process and initiate goal-setting with 15 new projects commencing in 2001-2002.
2) Create the “data warehouse”, complete with data-collection and data-entry procedures for building description, process description, monitored technical and financial performance and customer feedback.
3) Conduct 15 POE on completed projects, divided among QRS, Level I, Level II, and Level III POE’s:
    a. Conduct additional QRS training sessions and conduct project-manager-led QRS sessions.
    b. Conduct on-line surveys with end-users and building operators for projects that have been open at least one year; create standardized reporting procedures and templates for the results.

c. Create the methodology for and pilot-test two Level II POE's; conduct additional Level II POE's.
d. Conduct Level III POE's.

4) Develop and distribute graphic "balanced scorecard" reports for the Level I POE's.
5) Develop the web site and databases, and implement the process for adding and accessing informal lessons-learned and for documentation.
6) Create one or two design guides.
7) Develop a POE awareness and training module, making it part of the existing training program attended by DGS employees, customers and stakeholders.

WHAT IS POE?
WHY IMPLEMENT A POE PROGRAM?

New computers are faster, less expensive and more reliable than computers of even a few months ago. New-model automobiles are safer, less polluting, and need less maintenance than the models they replace. Automobiles and computers constantly improve because their industries are heavily committed to feedback on product performance and customer satisfaction. They collect input from a range of stakeholders, including those who sell and maintain the products, analyze the information and make it central to developing new products.

In this spirit, the DGS Post-Occupancy Evaluation (POE) Program is being implemented in an effort to help the State build better buildings overall for both user-occupants (tenants) and customers (citizens). In Governor Davis' terms, state buildings will be: "*models of energy, water, and materials efficiency; while providing healthy, productive and comfortable indoor environments and long-term benefits to Californians*." (Executive Order D-16-00).

Chief Deputy Director Dennis Dunne has established an ambitious goal: State buildings will not merely respond temporarily to this year's energy crisis or next year's new emergency. They will increasingly be better designed, more comfortable, more sustainable, more accessible, more flexible and conducive to enhancing worker productivity and student learning—in other words, "high performance" workplaces and schools.

POE is the systematic evaluation of a building project once it has been completed and occupants have had an opportunity to "settle in" to their surroundings. A POE assesses how effective and efficient the building is from the perspective of a variety of stakeholders, particularly occupants and operators. It originated in the 1960s as a method to evaluate the success or failures of completed projects and utilize the information to improve future projects. It has been used by a large number of large building delivery organizations including the Army Corps of Engineers, US GSA, the World Bank, California Department of Corrections, Ministry of Education of France, US Navy, States of Minnesota and Massachusetts and others.

Shortly after a new California prison was occupied, the warden requested $1.6 million in change orders to modify his kitchen. The CDC was willing to fund this but conducted a post-occupancy evaluation to help target the use of the funds. The POE revealed that the prison staff did not know how to operate the new cook-chill system and that incorrect food carts had been ordered: they didn't fit through the doors. The result: the $1.6 million requested was reduced to $300,000 and the prison staff were very satisfied--their viewpoint was considered.

Most previous POEs have involved case studies of buildings as they actually operate. These studies have often relied on surveys, interviews and other user-oriented studies.

The DGS POE Program will extend the previous case-study-oriented POE work to include several processes:

- **Set performance criteria** for buildings and building delivery processes that are based on the values, business practice and competitive position of DGS and its customers.
- **Evaluate performance** by getting feedback from customers, assessing the technical and financial performance of buildings, and comparing these evaluations to other benchmarks within and outside DGS.
- **Analyze and interpret evaluation results** in ways that allow DGS staff and customers to apply the results to their own situations with future buildings.
- **Create a centralized "organizational memory"** that includes both descriptions of current DGS practice as well as descriptions and evaluations of buildings and processes.
- Broadly **disseminate results** in ways that are meaningful to key decision-makers, in language and formats that they can use on future projects.
- Create the **conditions for effective implementation** of results, including changes in work processes, adequate resources and organizational incentives and support.

Incorporation of the POE program into the normal business practices of DGS will result in State buildings — like new automobiles and technology applications — that will be of better overall quality and comfort and, therefore, will increase satisfaction by DGS' multiple stakeholders. In addition to DGS employees, these stakeholders may include: customer agencies, Department of Finance, Legislative Analysts' Office, elected officials, the real estate and building industries, etc. Their support is needed in a variety of ways, including the allocation of resources for implementation.

OVERALL GOAL OF THE POE PROGRAM

The **overall goal** of the POE Program is to support the State of California in the planning, design, construction and operation of better buildings. The POE Program will provide a framework for answering several core questions,

"What are we doing?"

"How are we doing?"

"How can we do better?"

"How can the buildings work better?"

To achieve this goal, DGS will gather information in order to:

1. *Document and benchmark what we're doing now in terms of size, cost, materials, design strategies, etc.;*
2. *Monitor how effective that process is;*
3. *Learn how we can do better; and*
4. *Apply and implement "lessons learned" and new technologies.*

The POE Program will provide an organizational memory — a "data warehouse" of current practices — which will enable DGS to monitor performance, identify problems, and store "lessons learned" to improve both the quality of the building delivery *process* as well as the overall *quality* of future buildings.

"The Post-Occupancy Evaluation ("POE") can help DGS employees and its customers by providing an objective, empirical assessment of the design and performance of the buildings and spaces occupied by the state and determine whether they meet the needs of the people who work in them and the customers they serve. Economic and functional performance can only be measured through the POE."

■ *Gerald McLaughlin, Real Estate Officer RESD*

KEY OBJECTIVES

Consistent with the overall goal, the POE Program includes the **following key objectives**:

1. Make POE **a routine part of DGS business practices** — Integrate documentation and evaluation into the normal work activities of developing buildings. Develop a POE that is easy to work with for staff and customers.
2. Provide fast and straightforward **access to information**, and make that information compelling, useful, easy to understand, and easy to access.
3. Encourage **continuous improvement** — Incrementally improve DGS building delivery and expand the range of activities that would benefit from POE information (i.e., Five-Year Plan, facilities plans, Capital Outlay Budget Change Proposals, Budget Packages, design, construction, commissioning, and ongoing building operations).
4. **Nurture innovation** — Allow innovative designs and processes to be spotlighted and tested with the understanding that innovations are learning opportunities.
5. Have **statewide** impact and **influence all parts of DGS' facilities operations** — Provide support to DGS-owned and leased projects as well as other State-owned buildings. Create forums for networking among school districts, counties, cities, colleges and university systems to share lessons learned and expand the concept of "excellence" in public buildings.
6. **Enhance customer communication** — Improve communication opportunities between DGS and its customers during initial planning, design, construction and during building operations after occupancy.
7. Support **customer education** — Provide customers with viable building operations options during programming, planning, design, construction, move-in and post occupancy.

APPROACH

The POE Program is adopting a "balanced scorecard" approach to meet the needs of the wide variety of stakeholders and decision-makers (DGS, customer agencies, control agencies, the public, etc.). The balanced scorecard approach was developed by organizational consultants Kaplan and Norton for strategic planning. It is balanced in the sense that it includes financial factors as well as other important issues, such as impact on workers. We will adopt this framework for POE.

The customer-oriented Disney Company has been conducting an aggressive evaluation program since the 1970s, resulting in extensive databases of predictors of customer satisfaction, performance of building elements and the impacts of major design and programmatic decisions.

The databases play a key role in every decision ranging from the width of Main Street to the number of theme characters to hire.

This balanced approach will address the evaluation of projects and processes **from four major viewpoints**:

1. **Financial performance**
   - first costs
   - life-cycle costs
   - staffing costs
   - rentability
2. Impacts of the process and buildings on the **business success** of DGS and its customers
   - support organization's recruitment and retention of staff
   - encourage R&D groups to innovate
   - provide efficient and effective work flow
   - support physical and mental health
   - enhance employee productivity
   - meet customer needs
3. **Customer satisfaction,** including:
   - building users and tenants
   - participants in the building delivery process and building operators
4. **Impacts on other stakeholders,** including:
   - the communities where State buildings are sited
   - other state customer agencies and state decision-makers
   - the building industry
   - the facilities management industry
   - the California public, in general

INTEGRATION WITH OTHER DGS PROGRAMS

The POE Program will support and integrate with other DGS programs focused on increasing quality and improving customer service (i.e., Excellence in Public Buildings, OneDGS, Sustainable Task Force (Blueprint for Sustainable Buildings), Commissioning, etc.

DSA's *Excellence in Public Buildings*

The DGS Post-Occupancy Evaluation (POE) Program will systematically gather feedback on a wide range of elements from completed projects (e.g., space relationships, energy efficiency, maintenance costs, support for organizational needs, project management strategies, etc.) that can be easily fed forward to successive projects. It is aimed at improving excellence by impacting the *process of delivering buildings* — including the Five-Year Plan, facilities plans, Capital Outlay Budget Change Proposals, Budget Packages, design, construction and operations — as well as the *quality of the buildings* that are delivered or maintained.

It is clear that the POE Program is closely aligned with several objectives of the Excellence in Public Buildings" Initiative:

1. Increase stakeholders' awareness and understanding of the importance of program planning and quality design in meeting building performance expectations.
2. Define building requirements accurately.
3. Establish clear standards and guidelines and then build public buildings that meet them.
4. Develop mechanisms to collect and apply evaluation data from users of completed buildings to improve planning and design of future buildings.
5. Leverage State building contracts to transform the marketplace regarding best practices and emerging technology.
6. Improve recognition for exemplary state and school building projects.

"What is needed is an education campaign which teaches everyone involved in the process what the total picture is. How well do the various divisions know what the other does. …… There is a misconception that when a building is occupied all the problems have been corrected. Feedback to the design professionals from the occupants would tell them where the shortcomings are."
■ *Peter Liloyan, Senior Structural Engineer, DSA*

RESD's Goals and Objectives

The POE Program also supports the following RESD goals and objectives discussed in the RESD Strategic Plan.

- Goal 1, Objective 1: Improve customer satisfaction
- Goal 1, Objective 2: Improve customer outreach program

- Goal 2, Objective 1: Determine the competitiveness of the costs of our products and services
- Goal 2, Objective 1: Maintain competitiveness of the cost of our products and services
- Goal 2, Objective 2: Improve quality of services
- Goal 3, Objective 3: Increase the performance of the State's portfolio
- Goal 5, Objective 1: Improve quality of communication
- Goal 5, Objective 2: Increase morale
- Goal 6, Objective 2: Increase electronic communication with RESD employees, external customers and stakeholders by developing the RESD Internet and Intranet web sites
- Goal 6, Objective 4: Improve key business processes.

To make integration with these related programs possible, data entry and retrieval must be easy and the use of information must be natural and routine. Strategic marketing and ongoing education about POE activities will be needed to encourage both project and process managers to use new information resources to enhance their "normal" work activities.

POE PROGRAM QUALITIES

The POE Program will:

- Start small
- Grow quickly
- Be cost-effective
- Seek participation and buy-in from a wide range of DGS staff and customers
- Extend to all DGS building activities, such as "small leases," as well as signature buildings, DSA as well as RESD, etc.
- Support continuous improvement in DGS processes and buildings, as well as qualitative leaps that will help to transform DGS into a more innovative, customer-oriented organization
- Seek ongoing feedback about performance of the Program itself and be flexible in changing directions as appropriate
- Support key DGS, RESD and DSA values in the following areas:
  - Customer-oriented: increase customer service, enhance credibility with stakeholders
  - Financial: increase competitiveness, lower costs
  - Business process: enhance quality, produce settings that enhance productivity
  - Learning and professional development: increase accountability, promote creativity, improve morale and improve employee knowledge and productivity (Financial Business Plan, FY 2000-2001 & FY 2001-2002).

The POE Program supports these elements by creating processes that encourage broad participation; provide a structure for communication; include empirical results; and help make DGS more performance-oriented, more customer responsive, more innovative, and a better place to work. By increasing feedback from customers about the performance of buildings and the building delivery process, it seeks to help bring customers into the process as partners. By devoting resources and attention to innovation, it also will accelerate both incremental improvements and qualitative "leaps."

"So, with a 'view from the trenches', as an employee who gets the "trouble calls",……, what I see as most critical is the involvement of the people who maintain the systems in the process. We are the people who are left after the design engineers, architects, project managers, inspectors, contractors and subcontractors are all gone. That is, the tenants and us."
Lance Muller, System Administrator Downtown Sacramento Energy Management System, RESD

"How an employee is affected by his/her physical environment, and how that environment allows or limits the function of that employee, is crucial to our knowledge to be able to "build better." …….. We may save energy, but at what cost to those who inhabit the buildings?"
■ *Wendy Roberts, Project Director for Tenant Improvements Capitol Area East End Project, RESD*

DGS EMPLOYEES DESCRIBE THE BENEFITS OF A POE PROGRAM

In order to involve as many DGS staff as possible in the POE Program strategic planning process, the Charter Team sponsored a contest and invited several hundred DGS employees to address the question, "How can Post Occupancy Evaluation help you or DGS do a better job?"

The contest resulted in a total of 18 thoughtful responses containing numerous issues, benefits and needed actions related to the developing POE Program. Items from several responses were grouped into the categories noted below. Representative quotes from contest entries are included.

1. Supplying an Accessible Venue for the Accumulation and Exchange of Experiences and Ideas.

Respondents want a forum to exchange ideas and experiences with colleagues, customers and consultants. POE will provide this “common forum” for voicing and exchanging ideas, experiences and opinions by all stakeholders involved in DGS projects. The increased dialogue among DGS staff and customers during various stages of a project will have a positive impact on key strategic decisions that ultimately affect customer satisfaction, cost, technical performance, sustainability, etc. This venue will help create the database and benchmarks (the "data warehouse") for issues such as project scope, building/project size, costs, schedule and location so both DGS and customer team members can see "What we are doing," on their own projects as well as on concurrent and past projects.

> “…. *knowledge gathering could be fine-tuned to minimize the amount of time expended trying to learn from previous errors*.” [Ian Ekholm, Project Director, RESD]
>
> “ *…. improve communication channels*…” [Howard Sacks, RESD]
>
> “*Users must understand they are part of the team. Users should understand construction limitations and the problems that could result from their actions or late responses. The importance of receiving program input from the right sources and to take responsibility for their actions. Understanding reality verses*

perception. Understanding the parameters of budget, scope and schedule control." [Roy Tjen-A-Looi, Project Director, RESD]

"*The POE can be an essential tool toward improving the satisfaction of DGS's customer agencies by providing a forum for listening to their concerns and recommendations*." [Chris Wicks, Project Director, RESD]

2. Capturing Individual and Overlooked Experiences as "Organizational Capital."

As expressed by different respondents, the building construction and management processes involve many experiences and events that typically remain undocumented and are lost when someone retires or moves to another position. This lack of documentation means other teams are deprived of lessons painstakingly learned by their peers and can lead to an unnecessary number of repeated mistakes. These lessons often deal with "everyday problems" that are frequently overlooked in formalized project summaries.

POE will provide a means to capture the experience of seasoned project managers and project teams, making their experiences more broadly accessible to other DGS staff and customers. In this way, key information is not lost when people retire or move to other assignments.

"*DGS projects often are assigned to staff on the basis of staff time availability, rather on location or knowledge of a situation, facility, or area. As a result, several different staff members can be working on different projects covering the same situation, facility, or area. With the turnover of personnel at some of the customer agencies, the "Institutional Memory" is often not available to DGS staff. Knowledge acquired painfully from previous experiences may be lost as a result, and DGS may repeat the same mistakes because of turnover at the customers' end*" [Ian Ekholm, Project Director, RESD]

"….. *Loss of productivity occurs due to the "little things" -- such as dampers that don't close fully, or pilot positioners that get tweaked, or valves that aren't methodically maintained. It also occurs due to changes in the ways tenants use the system, like*

turning on whole floors so one person can work on a weekend day, or where a "computer room" outgrows the space allocated to it, and then moves out into spaces that were designed for less intensive uses." [Lance Muller, System Administrator, Downtown Sacramento Energy Management System, RESD]

" …. It will be an opportunity for my staff to share the lessons that they have learned from daily operations." [Nick Cimino, San Francisco Regional Manager, RESD]

3. Creating an Objective Venue for DGS Facilities to be Evaluated Based on a Broad Range of Empirical Data.

"*The Post-Occupancy Evaluation ("POE") can help DGS employees and its customers by providing an objective, empirical assessment of the design and performance of the buildings and spaces occupied by the state and determine whether they meet the needs of the people who work in them and the customers they serve. Economic and functional performance can only be measured through the POE. We can determine whether the buildings and spaces meet the original intention of the designer. The POE can help identify problems in existing buildings (that usually can be fixed) and assists in reducing mistakes in future spaces and building designs*" [Gerald McLaughlin, Real Estate Officer, RESD]

"*Evaluation (POE) program will enable DGS to measure the quality of the design and construction in leased facilities and performance of the project team*". [Susan Dyckes, Customer Account Manager, RESD]

"…. *It promotes an honest and frank evaluation of the overall success or failure of the building from the user's point of view*." [Chris Wicks, Project Director, RESD]

4. Improving Communication with Customers.

POE supports a culture of ongoing exchange between DGS project team members and their customers — from project inception until after occupancy. Early in the process, DGS project staff can provide examples of past work that highlight strengths and weaknesses and identify key decisions and strategies. Using feedback from previous projects regarding the performance of specific design elements (e.g., HVAC, space allocations, adjacencies, circulation, materials, millwork, modular systems furniture, voice/data/telecom and special requirements), DGS can help customers create guidelines and allocate resources more effectively. Then at the end of the project, a climate of communication will make commissioning, move-in and post occupancy evaluation a more open, complete and empirical process.

> "*If one of the goals of this program is to improve Customer Service to users upon the occupancy or completion of a project, I see no better opportunity than to address their immediate needs on move-in day*." [Roy Tjen-A-Looi, Project Director, RESD]
>
> "*About six months after installation, when users have become totally immersed in the space, a study should be made…… Post-occupancy evaluation is the time when minor adjustments can be made without disturbing the pattern of operations, since the pattern itself is still new*." [Norton Chapman, Planning Manager, RESD]
>
> "*One of the most important things, I believe, in a project is the personal ["face-to-face"] contact after the project is complete*." [Sarah Thamer-Hallford, Project Director, RESD]

5. Improving Education and Management of the Customer.

By encouraging open communication between DGS employees and customers, POE provides an arena for ascertaining the level of understanding each has of the other's roles and concerns. In turn, it provides an opportunity for both the customer and project team managers to learn from each other, resulting in more knowledgeable employees on the service side as well as the user side.

> "…*the underlying issue that is really at the heart of this team's charter. Effectively Managing the Customer… In order to do this*

we have to learn many things about the customer before we can develop a scope schedule and budget. First of all we have to determine the customer's level of understanding about the project management process." [Elizabeth Parker, Executive Secretary, RESD]

"*Increase the control of occupants over their building environment*." [Nick Cimino, San Francisco Regional Manager, RESD]

"…*DGS can apply this feedback to better manage our customers and their expectations… to learn the missions and operations of my customers*." [Howard Sacks, RESD]

6. Better Understanding of How Users Are Affected by Building Environments.

Based on the data and feedback from questionnaires and observations, the POE Program can advance a better understanding of the psychological and behavioral interaction between employees and their physical work environment. For example, this includes learning how energy-saving and other technical strategies impact user satisfaction and support work processes.

"How an employee is affected by his/her physical environment, and how that environment allows or limits the function of that employee, is crucial to our knowledge to be able to "build better." From the ease of access, to the foot-candle availability, we, as builders, can only create, and hope that we're successful. We may save energy, but at what cost to those who inhabit the buildings? We may save money initially by doing one thing or another, but at what cost to those who inhabit the buildings? At what cost to those who manage them? At what cost to future changes?" [Wendy Roberts, Project Director for Tenant Improvements, Capitol Area East End Project, RESD]

7. **Improve the Credibility of DGS and Individual Design Teams.**

Through the setting of performance goals, the collection of empirical data, and careful and ongoing analysis, the information and tools derived from the

POE Program will provide DGS with increased credibility when making process and project recommendation and decisions.

> *"The Post-Occupancy Evaluation (POE) process will add value to our efforts and enable us to do a better job by providing meaningful user substantiation to our recommendations to various approving authorities."* [Regional Portfolio Managers, RESD]

> ***"**Creating a history of projects through the POE process would strengthen DGS' opinions and recommendations concerning project funding, fee structures, schedule impacts, and other issues which DGS incurs constant criticism by the Legislature."* [Diane Elliott, RESD]

8. **Supporting the Development of Building Program Documents and Guidelines.**

Technical documents (standards, guidelines, specifications and codes), as well as process documents (budget packages and lease provisions), stand to benefit from the data collection and analysis that supports consideration of the long-term impact of initial decisions.

> *"The collection of building-specific information including construction materials, siting, HVAC, electrical, and other building systems data will provide valuable information in the development of program guidelines for site selection. This data can also be used to develop special requirements for the Exhibit B specifications. Special lease language, leasing issues and their resolution can be documented to provide an additional leasing resource. Lease Management can provide valuable feedback on warrantee, replacement product and maintenance issues. This information can be used for modifying the Exhibit B specifications and lease provisions as needed."* [Susan Dyckes, Customer Account Manager, RESD]

IMPLEMENTATION STRATEGIES

The Charter Team and its consultants have developed several POE Program implementation strategies based on the need to start quickly but with a long-term commitment to a range of processes that will help DGS learn as an organization. These processes include:

- **Set performance criteria** for buildings and building delivery processes that are based on the values, business practice and competitive position of DGS and its customers;
- **Evaluate performance** by getting feedback from customers, assessing the technical and financial performance of buildings and comparing these evaluations to other benchmarks within and outside DGS;
- **Analyze and interpret evaluation results** in ways that allow DGS staff and customers to apply the results to their own situations;
- **Create a centralized "organizational memory"** that includes both descriptions of current DGS practice as well as descriptions and evaluations of buildings and processes;
- Broadly **disseminate results** in ways that are meaningful to key decision-makers, in language and formats that they can use;
- Create the **conditions for effective implementation** of results, including changes in work processes, adequate resources and organizational incentives and support;
- **Develop marketing and training strategies** for DGS employees, customers and other stakeholders.

The POE Program is based on several organizational processes:

- ✓ ***Setting testable, realistic performance criteria***
- ✓ ***Evaluating performance***
- ✓ ***Interpreting results***
- ✓ ***Creating on-line organizational memory***
- ✓ ***Disseminating results***
- ✓ ***Creating the conditions for effective implementation***

The POE Program is aimed at:

- ✓ ***Short-term, cost-effective impacts***
- ✓ ***Long-term organizational learning***

The Charter Team and consultants were interested in strategies that could be accomplished within the framework of existing business practices; would affect many aspects of DGS' business; and could be "phased-in" such that early steps would have a significant and visible impact and could be scaled-up as DGS gains experience and as funding allows.

The Charter Team and Steering Committee believe that marketing this POE Program with OneDGS, both internally to DGS employees and externally to customers and stakeholders, is critical to the success of this POE effort. A POE awareness and training module can be created and made part of the

existing training program conducted by DGS for affected employees of several divisions and branches, including, but not limited to: the Office of Technology Research, the Office of Legal Services, Telecommunications, the Division of Energy Management and the Office of Information Services; State agency customers; and other stakeholders, including the Department of Finance and the Office of Planning and Research.

Program Components

The following major program components are proposed:

- Level I POE
- Level II POE
- Level III POE
- POE Program Databases and Internet and Intranet Web Site
- Design Guide
- Implement the Results.

Each of these components is discussed in greater detail below, including proposed activities associated with each of these components for the 2001-2002 fiscal year. *(See Appendix A for completed projects that are candidates for POE activities in 2001-2002.)*

Level I POE

The purpose of the Level I POE is to set in place a multi-step process that is practical for most DGS projects. These steps include: **a) *goal-setting*; b) *creating documentation*; c) *Quick Response Study*; d) *On-line surveys*; and, e) *analysis, reporting and balanced scorecard***. *Within three years,* Level I POEs will be conducted on all projects meeting selected criteria, including most capital outlay projects and numerous special repair and leasing projects.

Level I POEs: Aimed at documenting and assessing buildings and building delivery through:

- ✓ ***A process for setting major project goals that are linked to evaluation***
- ✓ ***Documenting the building, process, performance, customer feedback***
- ✓ ***Doing a QRS a few months after occupancy***
- ✓ ***Conducting on-line surveys with users, operators and design process participants***
- ✓ ***Analyzing and reporting results***

LEVEL I POE STEPS

1. Goal Setting

The goal setting process will include an efficient, collaborative procedure for project teams to **establish the major goals for their projects**, and especially the goals that go beyond those that are typical for that project type. For instance, a project team might be particularly concerned with creating a project that uses very low energy, that is particularly flexible, or that encourages communication among office workers. The goal-setting process will be practical for both small and large projects with a menu of goals, each of which is **linked to possible outcome targets and a means of evaluating those targets**. The focus here is: "How do we know we have done a good job." These targets and evaluation elements will be tracked during the project and will be reported at the end. This goal setting process will be made a contractual requirement for design teams.

2. Creating Documentation

The documentation process will create an **integrated data warehouse** that will allow a wide range of analyses, both about a particular project as well as about larger aspects of DGS' portfolio and business concerns. This documentation will focus on several areas such as building processes, building description, technical and financial performance and customer feedback. Wherever possible, existing data will be used; streamlined methods for data collection and entry will be developed where existing data are not available. For example, where appropriate the Level I POE will use the on-line surveys developed by Berkeley's Center for the Built Environment and the US General Services Administration. The final data items will be chosen based on usefulness, availability, quality, reliability and cost of collection and entry.

- **Building process data** and **building description data** will be recorded by the A/E during the design process, with as-builts supplied at occupancy. These data will include basic data such as cost, size, time, etc., in standard format as well as computed information such as net-to-gross ratios. It will also include quality-of-service indicators such as change orders.
- **Monitored technical and financial performance information**, such as energy use and occupancy rates will also be included in the data warehouse.
- **Customer feedback information** from the Quick Response Study and on-line surveys will also be included.

3. Quick Response Study (QRS)

The QRS is aimed at **gathering structured feedback from the customer during the initial months of occupancy** with a focus on how the building might be fine-tuned to meet occupant needs. It will include a simple on-line form that allows occupants to suggest additions, changes or fixes; a touring interview by the project manager a few months after occupancy; a feedback session between the project manager and the customer to discuss priorities and strategies for coming up with fixes; and finally, the project manager will enter "lessons learned" into the POE Program database and web site.

4. On-line Surveys

Approximately one year after occupancy, end users, design team participants and building operators will fill out on-line questionnaires that probe their satisfaction with the building and process and their experience of its functionality. These questionnaires have been developed by the University of California Berkeley's Center for the Built Environment (CBE) and the US General Services Administration (GSA). Data collected from the questionnaires will be entered into the Program database. DGS will also be able to benchmark results against the US GSA's findings.

5. Analysis, Reporting and the Balanced Scorecard

Each of the above Level I steps will include documentation that will become part of the database project record and will be reported to the customer. Templates and standard reporting procedures will be developed to reduce the time required to analyze data and prepare reports. In addition, after the on-line survey is analyzed, a graphic "balanced scorecard" will summarize

"DGS projects often are assigned to staff on the basis of staff time availability, rather than on location or knowledge of a situation, facility, or area. As a result, several different staff members can be working on different projects covering the same situation, facility, or area. With the turnover of personnel at some of the customer agencies, the "Institutional Memory" is often not available to DGS staff. Knowledge acquired painfully from previous experiences may be lost as a result, and DGS may repeat the same mistakes ….."

■ *Ian Ekholm, Project Director, PMB*

the strengths and weaknesses of a project in terms of how the project did relative to DGS benchmarks, industry standards and the goals established at the inception of the project.

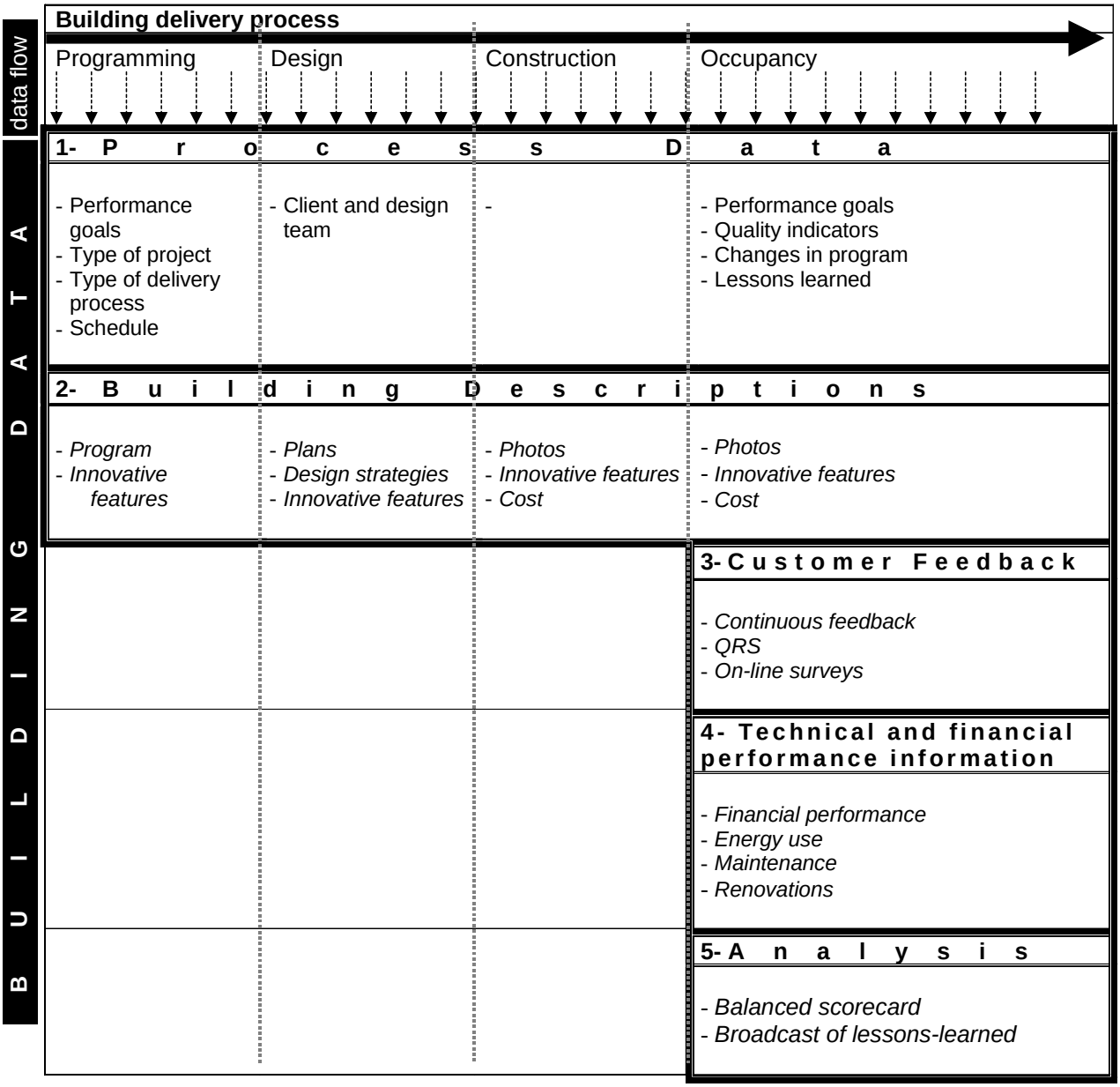

Table 1: In the Level I POE process, building data are collected throughout the building delivery process, including process data, building descriptions, customer feedback, technical and financial performance information and analysis. Process data and building description data are collected in the programming, design, construction, and occupancy phases of the building delivery process. Customer feedback, technical and financial information, and analytical studies are collected during the occupancy phase.

The following section delineates tasks for implementing Level I POE's for the 2001-2002 fiscal year.

LEVEL I TASKS: FY 2001-2002

1. Goal Setting

1. *Develop*
   - Establish initial space or building types for first round of projects. Candidates include schools, office space, CDF fire stations and DMV offices.
   - Develop goal-setting process that allows design teams to establish the major goals of a new project during initial programming, including links to measurable outcomes.
2. *Testing*
   - Test and revise as necessary.
3. *Implement*
   - Goal setting will be conducted with 15 projects scheduled to begin in FY 2001-2002. *(See Appendix B for list of new projects that will include POE in the project scope.)*

2. Creating Documentation

1. *Develop*
   - Establish information needs: examine key strategic decisions and work processes; create scenarios that illustrate how having better access to critical information will help building delivery.
   - Assess quality of existing data.
   - Decide what data will be included in the data warehouse based on need, cost, quality.
   - Establish procedure for A/E and/or project managers to enter data, minimizing the burden on already busy project managers.
2. *Testing*
   - Conduct pilot tests with projects at various points of development such as projects being initiated, projects in design and projects being occupied.
3. *Implement*
   - Initiate documentation with projects being started in 2001-2002 and possibly with QRS and on-line questionnaire sites.

3. QRS (Quick Response Studies)

1. *Develop and Testing*
   - An FY 2000-2001 contract is already in place to develop the QRS protocol and conduct three pilot test projects.
2. *Implement*
   - Conduct two additional training sessions.
3. *Conduct up to six QRS'*
   - Broadcast lessons-learned.

4. On-line Surveys

1. *Develop*
   - Underway: DGS is collaborating with the US GSA and UC Berkeley's CBE to develop the on-line survey.
2. *Testing*
   - Pilot projects will be conducted as part of testing the Level II POEs: the survey results will be compared with the results of interviews and site-visit observations to confirm that the on-line results are valid and reliable.
3. *Implement*
   - Conduct on-line CBE/GSA/DGS surveys with building operators, design process participants and users. Broadcast results to appropriate DGS employees and customer agencies.

5. Analysis, Reporting and Balanced Scorecard

1. *Develop*
   - Create balanced scorecard standardized reports, including both user response and other performance data for the on-line survey projects. Reports must be brief, easy to read and simple to produce, using macros or other tools.
2. *Testing*
   - Pilot test reporting formats.
3. *Implementation*
   - Provide reports for all POE Projects.

A potential example of the QRS in use: A project manager checks the responses to the on-line QRS form, noting the kinds of problems and requests that have been made. The Project Manager notes that there have been many complaints about wayfinding in the lobby and confirms this during a walkthrough. In the feedback session to the customer, the PM proposes a strategy for resolving wayfinding and the many other issues.

Level II POE

Level II POE's: Case studies aimed at understanding how and why a building operates as it does, based on an examination of building delivery, design and operations.

Whereas the Level I POE provides basic documentation and analysis of performance for projects, it is often important to understand how and why a building functions as it does. Level II POE's provide an understanding of how building delivery, design and operations work together to create an effective or problematic building. This is possible because Level II POE's will include on-site interviews, observations and technical monitoring and assessment, in-depth analysis of records such as maintenance costs, staff productivity, absenteeism and turnover, as well as the documentation described in Level I. For example, a Level II POE might explore the following questions:

- Why does a building have particularly low energy use?
- How do design, specification of the mechanical systems, maintenance and operations play a role?
- Why are some schools seen as supportive of education whereas other equally or more expensive schools are viewed as less so?

Wherever possible, several Level II POE's will be conducted of comparable settings to understand how different approaches work or how the same approach works in different contexts.

Projects will be chosen that include some combination of the following: 1) innovative elements; 2) multi-site comparisons that allow testing of alternative strategies; 3) opportunity to learn and apply new knowledge to subsequent projects; 4) high visibility customer or project; 5) customer who is interested in partnering; 6) a need for particularly authoritative or defensible information.

Sample Project

The following is a sample school-oriented Level II project. *(See Appendix C for a more detailed description.)*

The benefits of sustainable school facilities to students, teachers and school budgets can be significant, yet the rate at which school systems are incorporating sustainable strategies is slow. Currently, there is no single repository for lessons-learned about building performance and stakeholder satisfaction regarding sustainable building strategies or of tools to evaluate schools. In order to assess the impact of these strategies on stakeholders of school facilities, the development of a post-occupancy evaluation sustainability tool kit is proposed.

The tool kit will be used to:

1) identify existing problems so they can be solved in order to improve building performance and increase stakeholder satisfaction; and
2) compile information from multiple schools into one database identifying the technical performance of sustainable building strategies and their impacts on building stakeholders.

The tool kit will be developed based on the identification of critical decision points in the California schools' facility delivery and management process, appropriate indicators of sustainability, relevant standards and tests to measure facility sustainability and associated building attributes. A sustainability module for the on-line surveys will be developed to assess impacts of sustainable building strategies on building stakeholders, and simple testing and monitoring will assess impacts on actual building performance. The final analysis will include:

1) an assessment of critical decision points within California school systems; and
2) a sustainability tool kit that allows schools to conduct self-assessments of sustainability.

The following section delineates tasks for implementing Level II POE's for the 2001-2002 fiscal year.

LEVEL II TASKS: FY 2001-2002

1. *Develop*
   - Develop overall Level II procedures and work plan; create methods and materials; create a tool kit to assess technical performance.
2. *Testing*
   - Conduct pilot tests that allow closer examination of the on-line survey as it compares with the results of interviews and other methods.
3. *Implement*
   - Conduct Level II POE's.

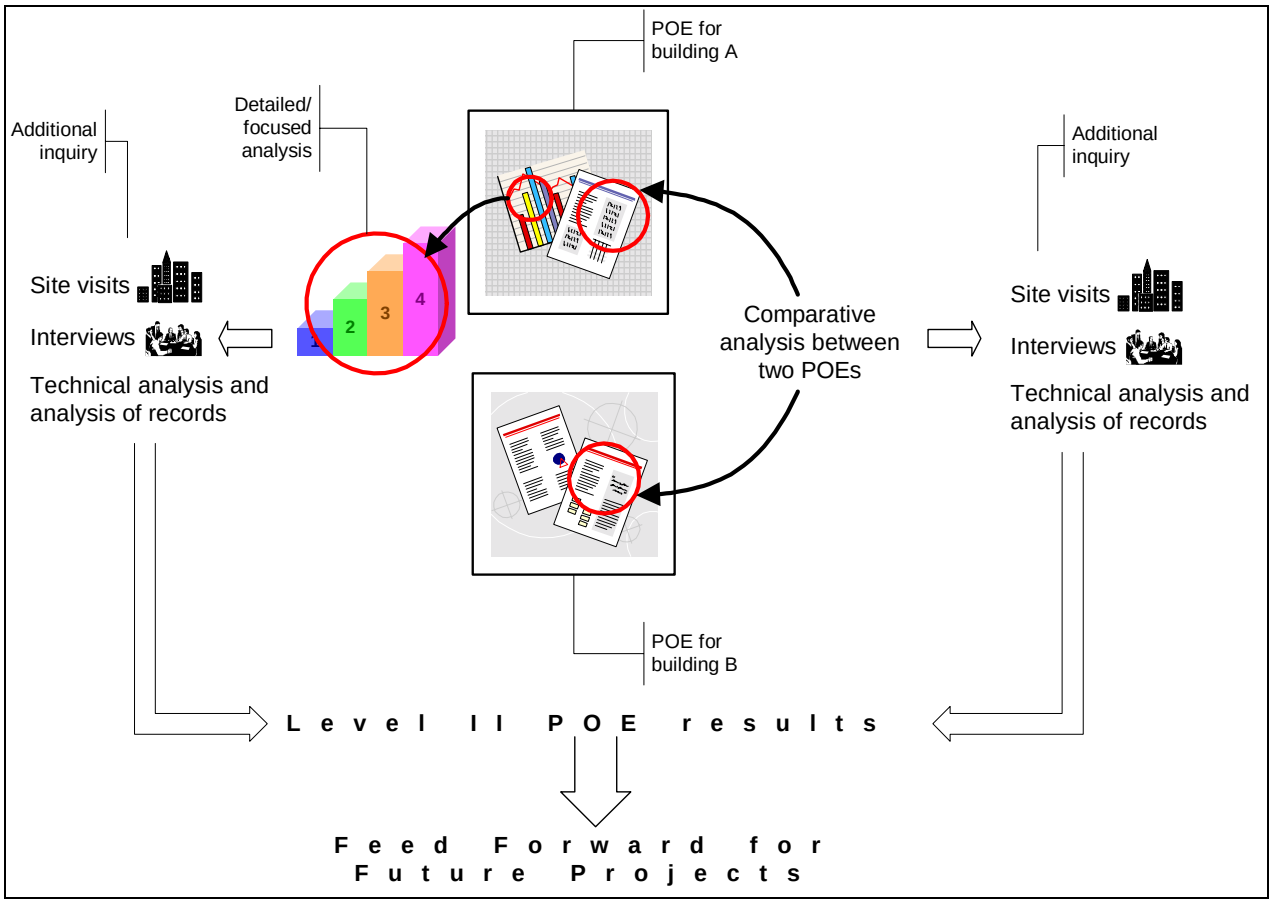

Figure 1: Level II POEs allow further investigations beyond Level I documentation. Interviews, site visits, technical analyses and analysis of records allow understanding of WHY a setting operates as it does and comparative analyses will allow further clarification of alternative approaches to solving problems.

Level III POE

A Level III POE is a special, focused study that addresses a specific issue with broad application for DGS or its customers. These studies may vary widely in depth and breadth. For example, a special study might document and analyze DGS buildings relative to the often-cited ratio between first costs and life cycle costs, (e.g., initial costs for a building are only about 2 percent of 40-year lifecycle costs; with energy and maintenance accounting for 6 percent and occupant payroll the remaining 92 percent). Other questions, for instance, in the case of schools, might include what classroom layouts might best accommodate alternative teaching and learning strategies, the impacts of alternative daylighting strategies on energy use and occupant satisfaction or the impact of raised flooring on long-term user flexibility and productivity.

A potential example of using Level III POE results: DGS is considering different daylighting strategies and is particularly interested in strategies that both reduce energy use and create a pleasant and productive setting. After a Level III POE that focuses on daylighting, DGS creates a special daylighting guide.

The following section delineates tasks for implementing Level III POE's for the 2001-2002 fiscal year.

LEVEL III TASKS: FY 2001-2002

Conduct two to four Level III POE's with the development and methods appropriate to the questions.

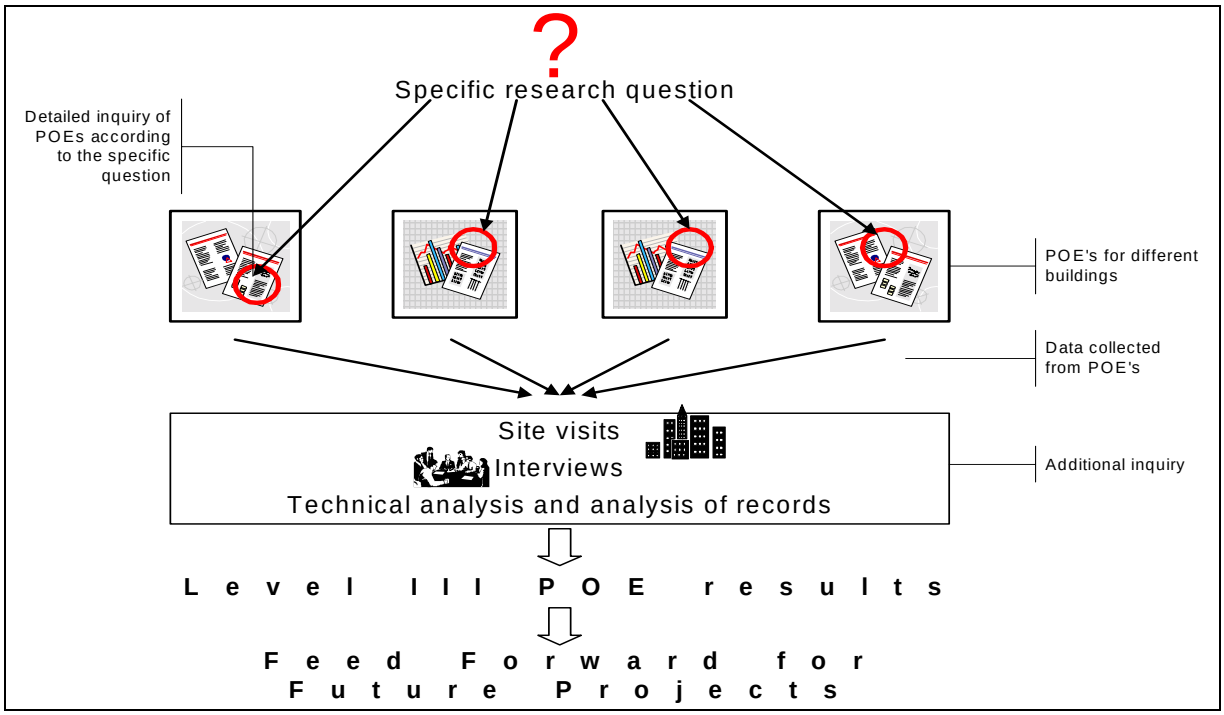

Figure 2: Level III POE's are focused analyses of Level I data as well as specific investigations of issues that are of general importance to DGS and/or its customers.

POE Program Databases and Internet and Intranet Web Site

The web site will be a growing, useful, easy-to-use information resource that allows access to the major program questions:

- *What are we doing***?** — Documentation of current practices such as program, materials, costs, equipment, etc., both factually and informal rules-of-thumb.
- *How are we doing***?** — Evaluation of performance to allow improvement.
- *How can we do better***?** — Discussions of the consequences of different solutions with recommendations.

A potential example of using the web site and database: A project manager is beginning to work with CalEPA for the first time. She goes into the database and scans the goals of previous projects and the problems and issues that arose. She walks into the first customer meeting able to anticipate many of their concerns.

The site will include an opportunity to enter informal lessons-learned as well as more authoritative evaluation results. It will allow broadcasting of lessons through email lists that allow subscribers to sign up for lists that interest them because of a given customer or issue focus. All information will be stored and accessible through a simple Web-type search capability. Data entry and quality will be monitored and maintained by DGS. However, different procedures will be established for different kinds of information. For example, informal observations will receive less scrutiny than proposals for changes in standards or guidelines.

The development of the web site and databases can be part of a larger DGS effort to create a unified data structure for all key business processes, or it can be a smaller-scale, special-focused effort as part of the POE Initiative and Excellence in Public Buildings Initiative. If it is a special effort it should be coordinated with other efforts to create access to DGS data.

The following section delineates tasks for implementing Level III POE's for the 2001-2002 fiscal year.

DATABASE/INTERNET/INTRANET TASKS: FY 2001-2002

1. *Develop*
   - Identify initial focus areas such as space types, tasks, work processes, building types or customers where better information will be particularly helpful; set up scenarios of use; examine available data; establish documentation procedures for new data

items; establish database structure; establish data entry procedures for informal lessons-learned, QRS and other data; create initial interface, navigation and query system.

2. *Testing*
   - Pre-test informal lessons-learned system, a system to disseminate results and data entry procedures for the Level I and Level II projects.
3. *Implement*
   - Create working system for the targeted initial focus areas, with others to be added as experience and funding allow.

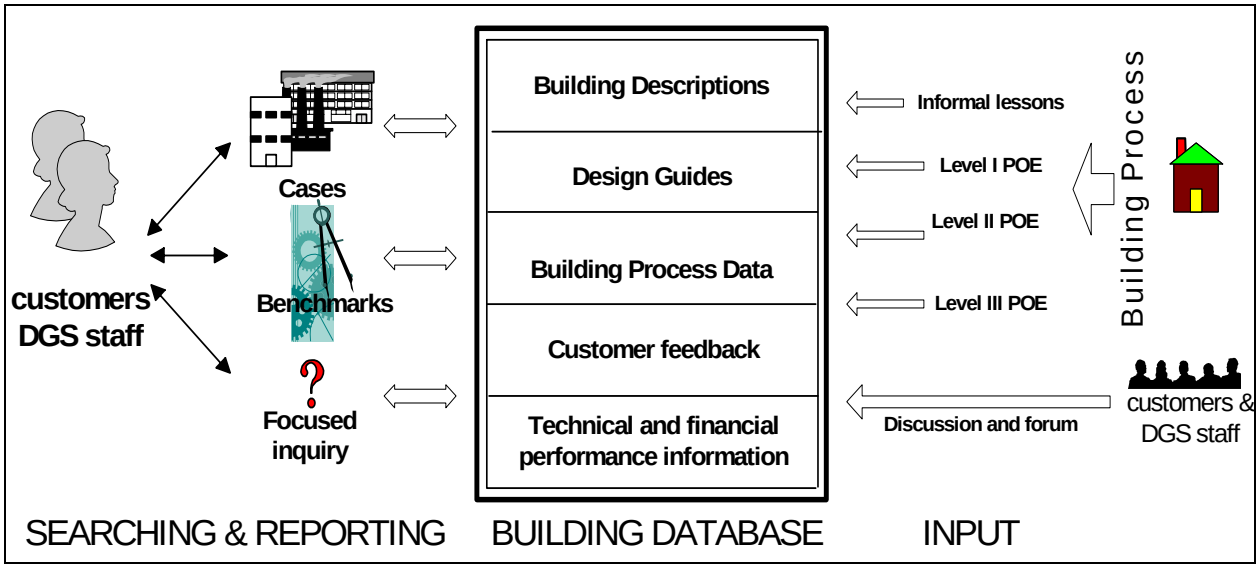

Figure 3: The Internet and intranet web site provides an accessible database for customers and DGS staff as well as a discussion and communication domain. The data collected from Level I, II, III POE's, informal lessons-learned and from individual contributions by customers and DGS staff are stored in a structured database searchable in different formats, e.g. according to cases, benchmarks, or a focused research question.

Design Guides

Design guides are used by the Administrative Office of the California Courts, US Courts, US GSA, and numerous other State and Federal agencies to speed up the process and reduce conflict during programming and design. A design guide is a blanket agreement about fundamental programmatic requirements for a building type. The design guide identifies the basic ranges for considerations such as the sizes of spaces and the quality of materials. A design guide is also an educational and reference tool for the project team.

GENERAL DESIGN GUIDELINES
▪ Spatial Relationship, Accessibility and Circulation Diagrams
▪ Courtroom Floor Plans
▪ Space and Furniture Tables
▪ Architectural Considerations
▪ Furniture and Finishes
▪ Courthouse Security
▪ Acoustical Considerations
▪ Mechanical-Electrical systems
▪ Automation Considerations
▪ Barrier-Free Access Requirements
▪ Signs

Table 2: Table 2 shows the major components of the US Courts Design Guide, originally developed in 1994 and constantly revised through POE.

Design guides are typically the result of a consensual process between the building agent, customer and experts. They summarize empirical experience about what works and what does not. POE's are used to create and to refine design guides. Design guides also can help shelter DGS and its customers from controversy. Because a design guide is based both on a consensus-building process and on empirical research from the POE program and elsewhere, decisions can be more easily defended. ("It's not a Taj Mahal; we followed the design guide!")

Several subjects seem particularly important for DGS design guides: 1) schools, particularly issues of sustainability in schools or of technology in schools, such as the "sustainable school planning and renovation" or "smart classrooms;" 2) CDF fire stations; 3) DMV offices; 4) spaces for work groups; and 5) offices aimed at creating high levels of communication among workers.

Design guides will be utilized when: 1) the building type, customer or element is particularly important; 2) there is a repeat customer and/or building type and/or building component; 3) there is a customer who is willing to participate in development of the design guide; or 4) there is a customer or building type that is contentious and hence reduction of controversy is particularly important.

Below is an outline of tasks required to develop design guides for the 2001-2002 fiscal year.

DESIGN GUIDE TASKS: FY 2001-2002

1. *Develop*
   - Choose two initial design guide subjects (e.g., smart classrooms, sustainable schools, DMV offices, CDF fire stations, or daylighting).
   - Establish a customer group and internal DGS group such as executive groups, working groups and groups of additional stakeholders.
   - Gather and assess research and existing guides.
   - Analyze existing projects to determine best practices, key differences in programs and approaches, etc.
   - Create a typology of types, programs, situations, etc.
   - Create draft design guides.
2. *Testing*
   - Test against best practices either using Level II case studies or through brief investigation of "best practice" projects.
   - Review with stakeholder groups, executive group.
   - Revise as necessary.
3. *Implement*
   - Publish design guides in electronic and hard copy format.
   - Evaluate projects that are produced as a result of the guides and revise the guide as necessary.

"Users must understand they are part of the team. Users should understand construction limitations and the problems that could result from their actions or late responses. The importance of receiving program input from the right sources and to take responsibility for their actions. Understanding reality verses perception. Understanding the parameters of budget, scope and schedule control."

■ *Roy Tjen-A-Looi, Project Director, RESD.*

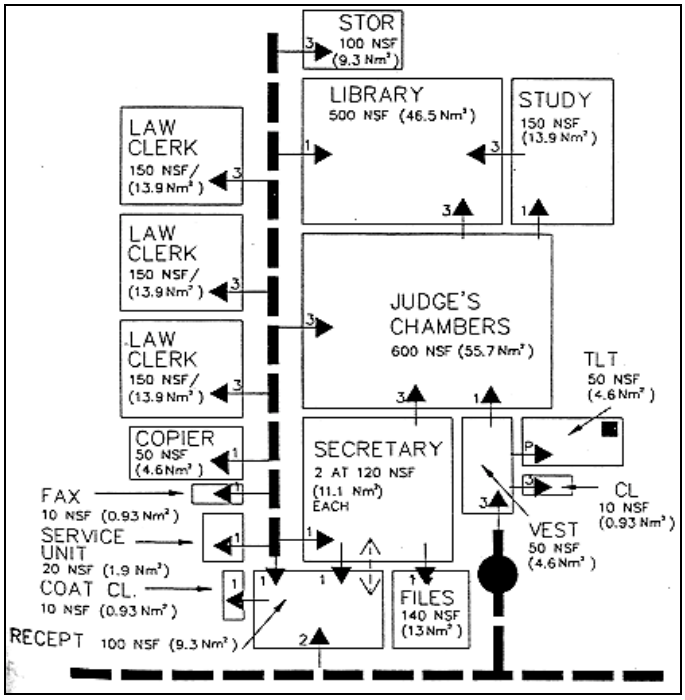

Figure 4: A sample diagram from the US Courts Design Guide showing the spatial relationships, accessibility, and circulation of a judge's chambers suite. The "NSF" numbers refer to net square feet and dotted lines show the circulation. The numbers 1-3 refer to the level of access control.

Implement the Results

The final program component may be the most critical of them all. User-friendly mechanisms and organizational strategies must be created to allow change and implementation of results. Otherwise, the most careful procedures, data collection, analysis and use of technology will be of no short- or long-term consequence.

1. *Develop*
   - As was described above, electronic and paper formats will be developed for reporting and disseminating information. There will be an ongoing effort to integrate findings into all aspects of DGS business such as customer meetings, internal staff discussions, staff performance reviews, consultant selection and direction, etc.
2. *Testing*
   - Pilot test procedures and refine as appropriate.
3. *Implement*
   - Disseminate results in a variety of ways, including: targeted broadcasting of e-mails; brief reports and report cards; and having results be part of routine managers' discussions.
   - Create customer-oriented materials such as design guides, lessons-learned reports.

"Creating a history of projects through the POE process would strengthen DGS' opinions and recommendations concerning project funding, fee structures, schedule impacts, and other issues which DGS incurs constant criticism by the legislature"

■ *Diane Elliott,RESD*

"***In order to move beyond 'business as usual' there will need to be a commitment of resources and effort, and [acceptance of] the potential risk attendant with implementing new processes. To address these 'costs', in addition to the feedback DGS and the customers need to improve services and results, we'll need to think about who th***e "***stakeholders" are that have influence over process, decision-making and priorities, and what their concerns are. We will want to use the data collected in POE to provide justification for change and garner support to get resources."***

■ *Lisa Drury, Customer Account Manager, RESD*

APPENDIX A:
CANDIDATE PROJECTS, COMPLETED 2001-2002

CANDIDATE PROJECT COMPLETED 2001-2002	TYPE OF POE	NOTES
CAL TRANS – Orange County Transportation Management Center	Level I	
CAL TRANS – Rancho Cordova Transportation Management Center	Level I	
CAL TRANS – San Luis Obispo Office	QRS Level I	
CDF – Coalinga Forest Fire Station	QRS Level I	
CDF – Hesperia Forest Fire Station	QRS Level I	
CDF – Ogo Forest Fire Station	QRS Level I	
CYA – Upgrade Correctional Treatment Center	Level I	
DEPT. OF PARKS & RECREATION – Folsom Powerhouse Restoration	QRS Level I	
DGS – CAL EPA Joe Serna Building	Level I	
DGS – Mission Valley State Office Building	Level I	
DGS – Sacramento Headquarters in West Sacramento	QRS Level I	
DHS – Richmond Lab	Level I Level II	
DMH – Metro State Hospital, Norwalk	Level I	
DMV – Grass Valley Field Office	Level I Level II	
DMV – Lakeport Field Office	Level I Level II	

CANDIDATE PROJECT COMPLETED 2001-2002	TYPE OF POE	NOTES
DMV – Lompoc Field Office	Level I Level II	
DMV – Motor Vehicles, Sacramento Headquarters – 4th Floor Renovation	QRS Level I	
DOJ – Central Valley Replacement Laboratory	Level I Level II	
DOJ – Fresno DNA Laboratory	QRS Level I	
DOJ – Richmond DNA Laboratory	QRS Level I	
DOJ – Riverside Replacement Laboratory	Level I Level II	
OES – Headquarters & State Operations Center, Mather Field/Sacramento	QRS Level I	
SCHOOLS PROJECTS Specific sites to be determined in conjunction with DSA	QRS Level I Design Guide	

APPENDIX B:
CANDIDATE PROJECTS, BEGINNING 2001-2002

CANDIDATE PROJECT BEGINNING 2001-2002	TYPE OF POE	NOTES
CDC – California Men's Colony – Ambulatory Clinic	Level I	
CDC – California Men's Colony – Mental Health Services Building	Level I	
CDC – California State Prison, Sacramento – Psychiatric Services Unit	Level I	
DEPT. OF PARKS & RECREATION – Los Liones Trailhead	Level I	
DBW – Humbolt Bay BISC	Level I	
DBW – Channel Island BISC	Level I	
DGS – Office Building #8	Level I	
DGS – Office Building #10 (Education)	Level I	
DMH – Atascadero State Hospital – Multi-Purpose Building	Level I	
DMH – Metropolitan State Hospital – School Building	Level I	
DMV – San Ysidro Field Office Replacement	Level I	
DMV – Stockton Field Office Replacement	Level I	
DOJ – Statewide DNA Lab	Level I	

APPENDIX C: A POST-OCCUPANCY EVALUATION SUSTAINABILITY TOOL KIT FOR CALIFORNIA SCHOOLS

The Problem

The benefits of sustainable school facilities to students, teachers and school budgets may be significant, yet the rate at which school systems are incorporating sustainable strategies is slow. With hundreds of new schools being constructed each year in California, there are ample opportunities to design and build facilities that minimize harmful environmental impacts and maximize building performance and user satisfaction. Data regarding the use of sustainable building strategies in schools is scattered and few studies have evaluated the impacts of these strategies on building users. Currently, there is no single repository for lessons learned about building performance and stakeholder satisfaction regarding sustainable building strategies.

A Proposed Solution

In order to assess the impacts of sustainable building strategies on stakeholders of school facilities, the development of a post-occupancy evaluation sustainability tool kit is proposed. The tool kit will be designed so school districts can conduct self-assessments of their facilities. The data collected during these assessments will be used to:

1. Identify existing problems in schools so they can be solved in order to improve building performance and increase stakeholder satisfaction.
2. Compile information from multiple schools into one database regarding the technical performance of sustainable building strategies and their impacts on building stakeholders, including building operators, design process participants and users.

Project Description

The following tasks are proposed:

Task I: *Identify critical decision points in the California Schools' facility delivery and management process where sustainability can most effectively be incorporated AND identify existing data streams* (i.e., data already being collected). An interview protocol will be developed and interviews will be conducted to develop a questionnaire for distribution to the appropriate person(s) in most or all California school districts. The questionnaire will

identify similarities in the facility decision-making process and identify common data streams.

Task II: *Identify indicators of sustainability to be included in the post-occupancy evaluation*. Three broad areas are recommended for inclusion in this proposed project — daylighting, indoor air quality and energy efficiency. Criteria currently under development by the Coalition for High Performance Schools will be considered for inclusion. Recognizing that there are many indicators of sustainable facilities (i.e., site considerations, materials selection, waste minimization, water conservation and others), additional sustainability indicators can be added later, once the proposed method has been shown to be useful and feasible for implementation in California schools.

Task III: *Identify relevant standards and tests to measure the performance of sustainable strategies*. For example, carbon dioxide monitoring is one means of evaluating ventilation effectiveness and relatively low-cost air quality monitors are available to measure some indoor pollutants. Appropriate, easy-to-use means of measuring technical performance of sustainable strategies will be identified and included in the post-occupancy evaluation.

Task IV: *Identify building attributes (e.g., design features, type of HVAC system, type of interior finishes, etc.) that need to be collected.* Specific building attributes are linked to both technical performance and stakeholder satisfaction. By compiling this information in a single database, lessons can be learned and distributed throughout California school systems regarding various sustainable building strategies.

Task V: *Develop questions for on-line surveys for school facility stakeholders*.

Task VI: *Develop the sustainability post-occupancy evaluation tool kit*. This tool kit will be designed for use as a component of the Level II post-occupancy evaluations.

Task VII: *Application of the tool kit in one or two selected schools to validate the method and make improvements as necessary*. Over time this will be tested in schools of different levels and types.

The Final Products

The final products will include: 1) an assessment of critical decision points within California school systems and 2) a sustainability tool kit that allows schools to conduct self-assessments of the sustainability of their facilities. The tool kit will contain, at a minimum: a) information regarding the benefits of sustainable building strategies in schools; b) detailed descriptions of required building attribute data and how it should be collected; c) instructions for conducting required monitoring and testing to evaluate building performance and conformance to applicable standards; and d) instructions for disseminating and collecting surveys of building stakeholders (ideally, on-line surveys.

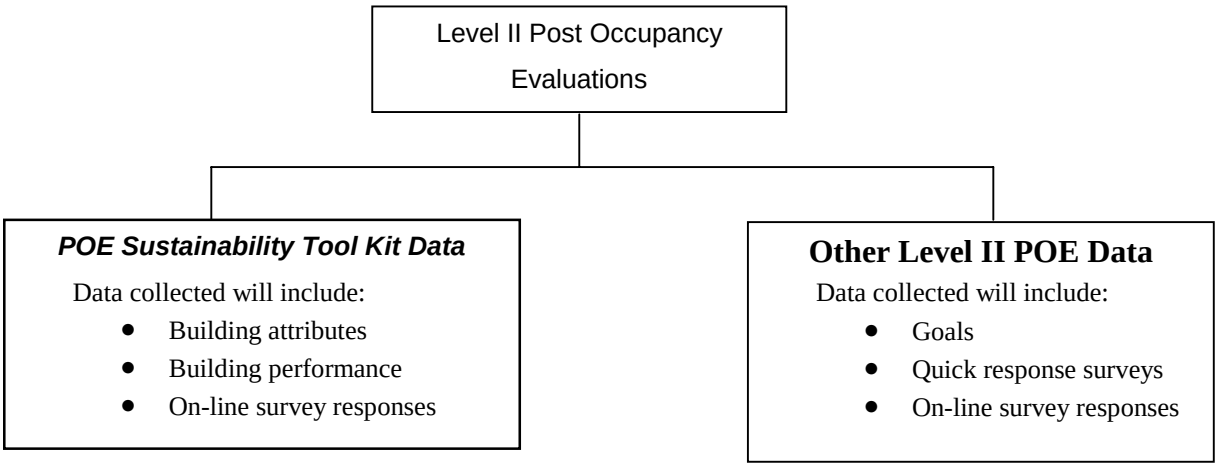

Figure 1: The POE Sustainability Tool Kit as a Component of Level II POEs

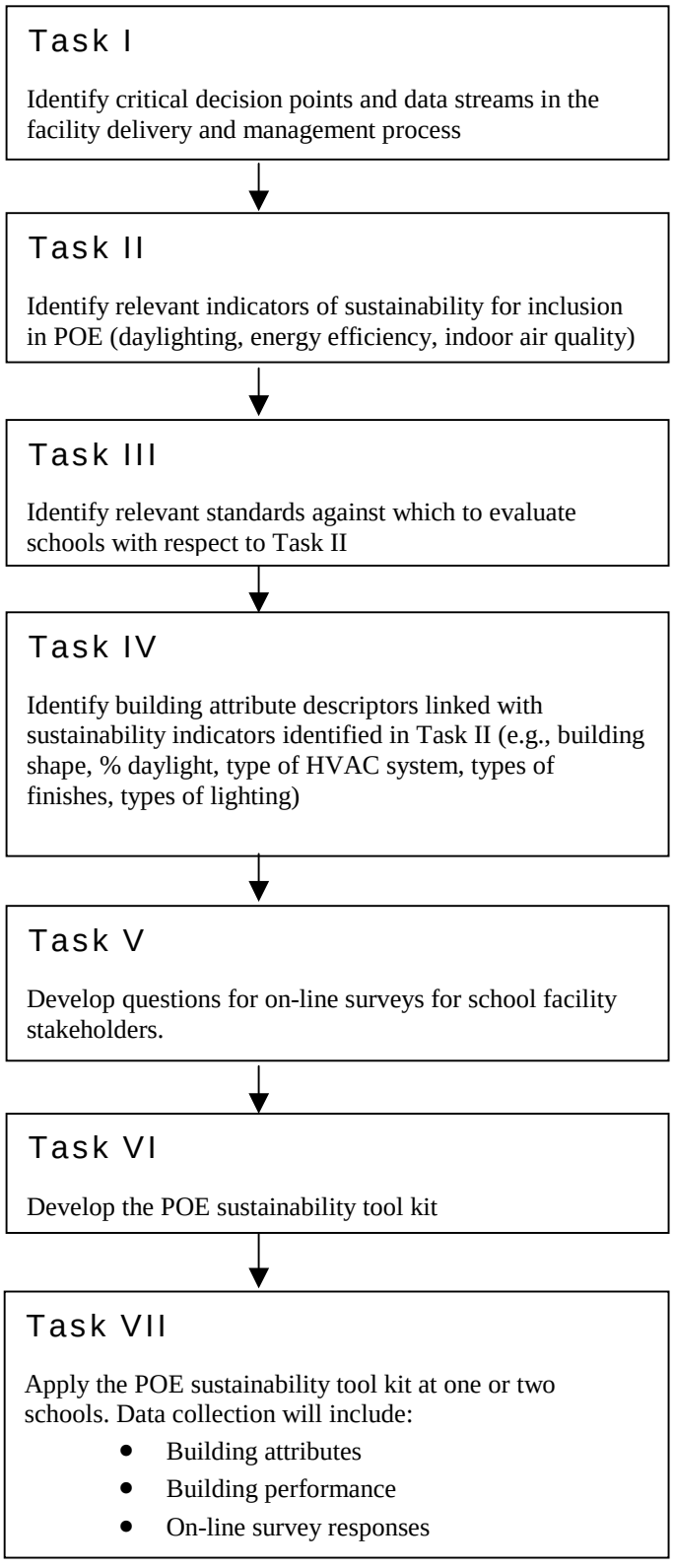

Figure 2: Development of the POE Sustainability Tool Kit